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TITLE: Codes for relay coincidence circuits

PERIODICAL: Referativnyy zhurnal. Matematika, no. 10, 1962,
44 - 45, abstract 10V220 (Stroje na zpracov. inform., v. 7,
1960, 21 - 35 [summaries in Czech, Eng., Fr., and Ger.])

TEXT: This study is devoted to the properties of the sequences $\{A_i\}$ of binary n -digit numbers A_i , in which two subsequent numbers differ from each other in only one digit (properties of Gray's codes) and in their coordinate sequences $\{h_i\}$ (sequences of the coordinate numbers which change on transition from the i -th to the $(i+1)$ -st member of the sequence), $0 \leq h_i \leq n-1$. Cyclic and internally cyclic sequences are distinguished.

A way is shown for their graphical representation in the form of a convex rectilinear polygon whose vertices are numbered by the indices i of the members of the sequence, and whose sides are numbered by the numbers h_i .

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The relationships between $\{A_i\}$ and $\{h_i\}$ as well as the properties of $\{h_i\}$ are investigated. It is shown that a cyclic sequence $\{A_i\}$ has an even number of members, and that the number of sequences with equal structure (sequences of one type) is $n!2^n$. The concept of normal sequences is introduced and their properties are examined. Also, the concept of internally symmetric sequence is defined, i. e., that of an internally cyclic sequence which behaves cyclically for all pairs $(i_1, i_2) = (2r, 2r+2q+1)$ without transgressing the property that one coordinate changes on the transition from the i -th member to the next. $r = 1, 2, \dots$; q is a constant number out of the interval $\langle 1, 1/2(i_{\max}-1) \rangle$. The coincidence sequences with $q = 1$ are discerned among the internally symmetric sequences. The property $h_{2r} = h_{2r+2} \neq h_{2r+1}$, $1 \leq r \leq 1/2(i_{\max}-1)$ of the coordinate sequences $\{h_i\}$ is demonstrated for the coincidence sequences. For $n+1$ digits, an algorithm for finding all coincidence sequences of one type is deduced. Reversible pulse counters with two inputs are proposed for a field of application. The resultant state of the counter depends on the

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difference in the numbers of pulses arriving at the first and second inputs. 3 references. [Abstractor's note: Complete translation.]